

Facilities Plan for the Production of Endangered Fishes to Meet State Stocking Plans as Part of the Upper Colorado River Endangered Fish Recovery Program



Upper Colorado River Endangered Fish Recovery Program

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to Meet State Stocking Plans as Part of
the Upper Colorado River Endangered Fish Recovery Program**

by

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EXECUTIVE SUMMARY

The purpose of this document is to identify the facilities necessary to meet the numbers of production fish identified in the revised stocking plans for the State of Colorado and State of Utah. Background and approach (including broodstock, rearing locations, and tagging) are considered for bonytail, Colorado pikeminnow, and razorback sucker. The Recovery Program has sufficient facilities and associated grow-out ponds to meet the demands of the revised stocking plans. The Recovery Program will need a minimum of 15.9 acres of grow-out ponds at Mumma and 2.6 acres of hatchery ponds at Wahweap for bonytail. Currently, there are 35 acres of grow-out ponds at Mumma and 3.2 acres of hatchery ponds at Wahweap for bonytail production. Colorado pikeminnow will be intensively cultured in tanks at the Grand Valley and Mumma facilities. The production of razorback sucker to meet the numbers in the State of Utah stocking plan require 5.0 acres of hatchery ponds and 10.4 acres of leased grow-out ponds; 10.8 acres of hatchery ponds and 18 acres of grow-out ponds are available for use by the Ouray facility. The production of razorback sucker to meet the numbers in the State of Colorado stocking plan require 18.1 acres of grow-out ponds; 98 acres of grow-out ponds are available for use by the Grand Valley facility. The annual cost to PIT-tag 40,280 bonytail, 2,680 Colorado pikeminnow, and 34,940 razorback sucker will be approximately \$300,000.

INTRODUCTION

Two stocking plans were developed and accepted by the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) in the late 1990's (Nesler 1998; Hudson et al. 1999) to restore and augment the populations of endangered fishes in the Upper Colorado River Basin. The development of recovery goals, which identify populations with sufficient numbers of adults to secure self-sustaining populations, resulted in the need to modify the original stocking plans (Hudson 2001; Nesler 2001) to achieve the target numbers in the recovery goals in a more efficient and timely manner.

The purpose of this document is to identify the facilities necessary to meet the numbers of production fish for bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), and razorback sucker (*Xyrauchen texanus*) identified in the revised stocking plans for the State of Colorado and State of Utah. In addition, maintaining the highest genetic diversity and following the genetic-management guidelines (Wydoski 1995; Czapla 1999) are essential. Annual Facilities Operation Plans detail the spawning, production, and distribution of fish to occur in the upcoming year.

Goal: To produce the required number and size of bonytail, Colorado pikeminnow, and razorback sucker identified in the revised State of Colorado and State of Utah stocking plans.

Objectives:

1. To meet the genetic-management guidelines goal of retaining as much genetic diversity as possible.
2. To have sufficient facilities and space necessary to produce and stock the required number and size of bonytail, Colorado pikeminnow, and razorback sucker.

Assumptions and Uncertainties

- The hatchery managers agree that local grow-out ponds are highly variable in production and do not produce as well as lined hatchery ponds. Therefore, they determined that an estimate of 1,000 pounds of fish per acre in hatchery ponds translates to 500 pounds of fish per acre in leased grow-out ponds. Further, the hatchery ponds at Wahweap State

Fish Hatchery, Bigwater, Utah (Wahweap) are able to produce approximately 2,000 pounds of fish per acre.

- Survival in hatcheries and grow-out ponds is highly variable.
- Survival estimates used in the State stocking plans are assumed to be accurate.
- Growth rates under hatchery conditions and in leased grow-out ponds are uncertain and typically depend on food availability and fish density. Stocking sizes could be reached a year earlier (i.e., bonytail at 200 mm total length [TL] before the autumn of the second growing season; Colorado pikeminnow at 150 mm TL after first full year of growth; and razorback sucker at 300 mm TL by the fall of the second year) if provided with sufficient food and fish at low densities.

BONYTAIL

Background

Bonytail have essentially been extirpated from the system. Dexter National Fish Hatchery and Technology Center, Dexter, New Mexico (Dexter) has maintained a broodstock since the mid 1980's; this broodstock was developed from 10 wild fish that were caught in Lake Mohave in 1981 (Hamman 1982, 1985). Wahweap has been developing a broodstock based on different year classes since 1996.

The State of Colorado stocking plan requires bonytail that are greater than 200 mm (8 inches) total length (TL) and the State of Utah stocking plan requires bonytail that average 200 mm TL. Bonytail that are 200 mm TL average in weight around 150 g (5.3 ounces). The State of Colorado stocking plan requires the annual stocking of 24,000 bonytail. These fish can all be raised at the J.W. Mumma Native Aquatic Species Restoration Facility, Alamosa, Colorado (Mumma) with associated local grow-out ponds throughout the San Luis Valley area. The State of Utah stocking plan requires 16,280 bonytail total per year. These fish can all be produced at the Wahweap .

Approach

Broodstock.—In the past few years, Dexter has been unable to meet our requests for bonytail fry due to other commitments in the lower basin. The Recovery Program will make an annual request to Dexter to provide 70,000 bonytail fry to Recovery Program facilities.

The Recovery Program will continue to develop a broodstock based on year classes at Wahweap. Wahweap should begin to produce bonytail required by the Recovery Program to ensure that the Recovery Program is meeting the production demands of the stocking plans.

Rearing Location Prior to Stocking (see Table 1).—Mumma will raise bonytail to be stocked in river reaches identified in the State of Colorado stocking plan. Mumma would receive fry from Dexter in the spring and grow intensively in tanks until the fall of the first year. Bonytail would then be transferred to grow-out ponds for the second growing season. Assuming that these grow-out ponds can produce 500 pounds of fish per acre, 15.9 acres are required on annual basis to produce 24,000 bonytail that are greater than 200 mm TL and weigh about 150 g. The Mumma facility and associations have over 35 acres of grow ponds. First year growth would occur in tanks at the facility, whereas second year growth would occur in grow-out ponds.

Wahweap will produce bonytail for stocking into the Green River Subbasin. Assuming that the hatchery ponds can produce 2,000 pounds of fish per acre (e.g., feeding, warm water, and a longer growing season), 2.6 acres are required on annual basis to produce 16,280 bonytail that average 200 mm TL and weigh about 150 g. Wahweap currently has 2.8 acres of ponds available. In the past, Wahweap has been able to raise up to 80,000 bonytail for stocking ranging in size from 120 to 180 mm TL.

Tagging.—All fish to be stocked will be PIT-tagged (Passive Integrated Transponder) to better evaluate the stocking plan and its various aspects (e.g., survival, growth, stocking location, and lot survival evaluation). The cost would be approximately \$151,050 to PIT-tag a total of 40,280 bonytail, which would occur in the autumn of the second year of growth for both Mumma and Wahweap facilities.

Table 1. Facilities needed to produce bonytail identified in stocking plans, based on pounds per acre of grow-out ponds, and acres available.

Facility (Stocking Plan)	Number to Produce	Pounds/acre	Acres Needed	Acres on Hand	
				Hatchery Ponds	Grow-out Ponds
Mumma (Colorado)	24,000	500	15.9	0.4	35
Wahweap (Utah)	16,280	2,000	2.6	2.8	0

COLORADO PIKEMINNOW

Background

With access to habitat in the Gunnison River and the Upper Colorado River above Palisade, Colorado, the State of Colorado recommended augmenting these river reaches with Colorado pikeminnow at 150 mm (6 inch) TL. The population of Colorado pikeminnow in the Colorado River is estimated around 700 adults (Osmundson 2001). A manual for culturing Colorado pikeminnow was developed by the Colorado Division of Wildlife (Schler 2001).

Approach

Broodstock.—A broodstock is maintained at Dexter, and the Recovery Program also considers fish in the Colorado River to serve as a source to create production fish by stream-side spawning, which has met with limited success in the past. The Recovery Program will make an annual request to Dexter to provide 10,000 Colorado pikeminnow fry to Recovery Program facilities. The fry will be distributed equally between the Grand Valley Endangered Fish Facility, Grand Junction, Colorado (Grand Valley) and the Mumma facility. Grand Valley will also continue to attempt stream-side spawning in the Colorado River. Colorado pikeminnow grown to 150 mm TL in excess of the State of Colorado stocking plan will be made available to the San Juan River Recovery Implementation Program.

Rearing Location Prior to Stocking.—Grand Valley and Mumma will raise Colorado pikeminnow intensively in tanks on an annual basis. Fish will be maintained in the hatchery

buildings and fed throughout the winter so that they will continue to grow and achieve the 150 mm TL requirement quicker.

Tagging.—All stocked fish will be PIT-tagged to better evaluate the stocking plan and its various aspects (e.g., survival, growth, stocking location, and lot survival evaluation). The cost would be approximately \$10,050 to PIT-tag a total of 2,680 Colorado pikeminnow, which would occur in the autumn after a full year of growth.

RAZORBACK SUCKER

Background

The only remaining riverine population of razorback sucker in the Upper Colorado River Basin exists in the middle Green River, with an estimated population of less than 500 adults. Stocking of individuals in this population has mainly been through excess brood fish. Other stockings included larval and juvenile razorback sucker into flooded bottomlands. Some of these stocked fish have shown up on the spawning bar during the spawning period and juveniles in wetlands had significant growth and survival demonstrating success in the stocking programs.

Experimental stocking of razorback sucker has occurred in the upper Colorado River (including the Gunnison River) since 1996 (Burdick 1995). Limited information is available as to the success of that stocking. For instance, one razorback sucker that was stocked in 1996 used the Redlands Fish Ladder on the Gunnison River this past summer. Four others stocked this spring also passed through the ladder this summer. The successful spawning and recruitment by these stocked fish have not yet been documented.

The State of Colorado stocking plan requires razorback sucker to be greater than 300 mm (12 inches) TL and the State of Utah stocking plan requires razorback sucker that average 300 mm (12 inches) TL. Razorback sucker that are 300 mm TL average in weight around 250 g (8.8 ounces). The State of Colorado stocking plan requires annual stocking of 16,440 razorback sucker. These fish can all be produced at the Grand Valley facility with associated local grow-out ponds throughout the Grand Valley area. The State of Utah stocking plan requires annual stocking of 18,500 razorback sucker. These fish can all be produced at the Ouray National Fish

Hatchery, Ouray, Utah (Ouray) with associated locally leased grow-out ponds throughout the Uintah Basin.

Approach

Broodstock.—In the upper Colorado River, a variety of fish from the Green, Colorado and Gunnison rivers, and both the Colorado River and San Juan River arms of Lake Powell, have been used to produce razorback sucker for stocking plans in both the Colorado and San Juan rivers. A breeding matrix that follows the genetic guidelines is used to maintain genetic diversity and reduce inbreeding.

In the Green River, the Recovery Program has developed 25 lots from 25 male x 25 female parents to maintain the genetic diversity. These will be used in a breeding matrix in order to develop F₁ fish for augmentation.

Rearing Location Prior to Stocking (see Table 2).—In the Upper Colorado River, razorback sucker are raised intensively in 4-foot and 8-foot diameter tanks at the 24 Road hatchery building for the first season and are distributed to a variety of grow-out ponds in the spring after the first year. Assuming that these grow-out ponds can produce 500 pounds of fish per acre, 18.1 acres are required on annual basis to produce 16,440 razorback sucker that are greater than 300 mm TL and weigh about 250 g. Since this size is normally achieved by the third growing season, twice as much acreage is required to meet the two years of growth (i.e., 36.2 acres). The Recovery Program currently has approximately 98 acres of grow-out ponds throughout the Grand Valley area.

In the past, razorback sucker at Ouray have been raised extensively in 0.2-acre hatchery ponds during the first season of growth. The Ouray facility is being modified to have a water re-use system for the inside culture during the first calendar year. Assuming hatchery ponds can produce 1,000 pounds of fish per acre, 5.0 acres of hatchery ponds could be used for the second year of growth, and the ponds would yield 9,100 razorback sucker that are greater than 300 mm TL and weigh about 250 g. An additional 10.4 acres of leased grow-out ponds that produce 500 pounds of fish per acre, would yield 9,400 razorback sucker that are greater than 300 mm TL and weigh about 250 g. The combination of using hatchery and leased grow-out ponds would yield 18,500 to meet the State of Utah stocking plan requirement. Because fish of this size are normally achieved by the third growing season, the fish may have to be held a third growing

season to attain the 300 mm TL, which would require a total of 30.8 acres of leased grow-out ponds (10.4 acres for second year class; 20.4 acres for third year class). The Recovery Program currently has approximately 18 acres of leased grow-out ponds throughout the Uintah Basin; an additional 12-15 acres are available from private land owners (T. Modde, U.S. Fish and Wildlife Service, personal communication).

Tagging.—All stocked fish will be PIT-tagged to better evaluate the stocking plan and its various aspects (e.g., survival, growth, stocking location and lot survival evaluation). The annual cost would be approximately \$131,025 to PIT-tag a total of 34,940 razorback sucker, which would occur in the second or third year of production for both the State of Colorado and State of Utah stocking plans.

Table 2. Facilities needed to produce razorback sucker identified in stocking plans, based on pounds per acre of grow-out ponds, and acres available.

Facility (Stocking Plan)	Number to Produce	Pounds/acre	Acres Needed ¹	Acres on Hand	
				Hatchery Ponds	Grow-out Ponds
Grand Valley (Colorado)	16,440	500	18.1 (36.2)	3.5	98
Ouray (Utah) - hatchery ponds	9,100	1000	5.0	10.8	-
leased grow-out ponds	9,400	500	10.4 (20.4)	-	18

¹Acres needed assumes fish attain 300 mm TL in the second season. If a third season is required to attain fish 300 mm TL, then the additional acres are identified in parentheses.

SUMMARY

The Recovery Program has sufficient facilities and associated grow-out ponds to meet the demands of the revised State stocking plans. The revised State stocking plans call for the production of fewer, but larger bonytail, Colorado pikeminnow, and razorback sucker than in their earlier versions. This requires an additional 1 year for bonytail and possibly 2 years for razorback sucker in culture facilities. The Recovery Program will need a minimum of 15.9 acres

of grow-out ponds at Mumma and 2.6 acres of hatchery ponds at Wahweap for bonytail. Currently, there are 35 acres of grow-out ponds at Mumma and 3.2 acres of hatchery ponds at Wahweap for bonytail production. Colorado pikeminnow will be intensively cultured in tanks at the Grand Valley and Mumma facilities. The production of razorback sucker to meet the numbers in the State of Utah stocking plan require 5.0 acres of hatchery ponds and 10.4 acres of leased grow-out ponds; 10.8 acres of hatchery ponds and 18 acres of grow-out ponds are available for use by the Ouray facility. The production of razorback sucker to meet the numbers in the State of Colorado stocking plan require 18.1 acres of leased grow-out ponds; 98 acres of grow-out ponds are available for use by the Grand Valley facility. The annual cost to PIT-tag 40,280 bonytail, 2,680 Colorado pikeminnow, and 34,940 razorback sucker will be approximately \$300,000.

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